

DP Barcode : 180750

PC Code No. : 105501

EFGWB Out :

1993

MAR 29 1993

TO: Linda Propst
Product Manager # 73
Special Review and Reregistration Division (H7508W)

FROM: Elizabeth Behl, Head
Ground Water Technology Section
Environmental Fate & Ground Water Branch/EFED (H7507C)

THRU: Henry Jacoby, Chief
Environmental Fate & Ground Water Branch/EFED (H7507C)

Attached, please find the EFGWB review of...

Reg./File # : _____

Common Name : Tebuthiuron

Product Name : Spike

Company Name : DowElanco

Purpose : Review Small Scale Retrospective Ground Water Study

Type Product : Herbicide

Action Code : 627 EFGWB #(s): 92-1186 Total Review Time = 10 days

EFGWB Guideline/MRID/Status Summary Table: The review in this package contains...

161-1		162-4		164-4		166-1	
161-2		163-1		164-5		166-2	
161-3		163-2		165-1		166-3	
161-4		163-3		165-2		167-1	
162-1		164-1		165-3		167-2	
162-2		164-2		165-4		201-1	
162-3		164-3		165-5		202-1	

Y = Acceptable (Study satisfied the Guideline)/Concur P = Partial (Study partially satisfied the Guideline, but additional information is still needed)
S = Supplemental (Study provided useful information, but Guideline was not satisfied) N = Unacceptable (Study was rejected)/Non-Concur

DP BARCODE: D180750

REREG CASE #

CASE: 819388
SUBMISSION: S422047

DATA PACKAGE RECORD
BEAN SHEET

DATE: 03/26/92
Page 1 of 1

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: REREGISTRATION ACTION: 627 GENERIC DATA SUBMISSION
CHEMICALS: 105501 Tebuthiuron

100.00

ID#: 105501

COMPANY:

PRODUCT MANAGER: 73 LINDA PROPST

703-308-8165 ROOM: CS1 2L5

PM TEAM REVIEWER: CAROL PETERSON

703-305-6598 ROOM: CM2 1121A

RECEIVED DATE: 07/09/92 DUE OUT DATE: 11/06/92

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 180750 EXPEDITE: N DATE SENT: 07/20/92 DATE RET.: / /

CHEMICAL: 105501 Tebuthiuron

DP TYPE: 001 Submission Related Data Package

ADMIN DUE DATE: 11/17/92

CSF: N

LABEL: N

ASSIGNED TO

DATE IN

DATE OUT

DIV : EFED

07/21/92

/ /

BRAN: EFGB

07/22/92

03/26/93

SECT: GTS

07/23/92

03/26/93

REVR : KCOSTELL

01/30/93

03/25/93

CONTR:

/ /

/ /

* * * DATA REVIEW INSTRUCTIONS * * *

TEBUTHIURON - LIST A

166-2 Small Scale Retrospective Groundwater Study

MRID 42390901

Please Review

Thanks.

* * * ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION * * *

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL
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1. CHEMICAL:

Chemical name: N-[5-(1,1-Dimethyl ethyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea

Common name: Tebuthiuron

Trade names: Spike

2. TEST MATERIAL:

Clay pellets, 20% a.i. formulation

3. STUDY/ACTION TYPE

Review of small-scale retrospective ground-water monitoring study for tebuthiuron.

4. STUDY IDENTIFICATION:

Title: Tebuthiuron Small Scale Retrospective Groundwater Study at Kenedy Ranch, Sarita, Texas

Authors: C.T. Stone, J.R. Bowes, and C.R. Hanson

Prepared by: DowElanco Environmental Chemistry Laboratory
P.O. Box 708
2001 West Main Street
Greenfield, Indiana 46140-0708

5. REVIEWED BY: Kevin Costello, Hydrologist
OPP/EFED/EFGWB/Ground-Water Technology Section

Signature: Kevin Costello

Date: 3/26/93

6. APPROVED BY:
Elizabeth Behl
Section Chief
OPP/EFED/EFGWB

Signature: E. Behl

Date: 3/26/93

7. CONCLUSIONS:

This study details the results of a small-scale retrospective ground-water monitoring study for the brush-control herbicide tebuthiuron. The study was performed on a ranch near Sarita, Texas, that had last been treated with tebuthiuron on March 24, 1986. The results of the study indicate that tebuthiuron was persistent and mobile enough to leach at least 15 feet to the water table, then still be present above minimum detection levels more than 4 years after the application.

The extensive site characterization performed by the contractor, Johnson and Co., gives a high level of confidence that this study was performed with a reasonable "worst case" scenario. The site is comprised of eolian sands over fluvial deposits. Monitoring wells were installed to avoid discontinuous, restrictive clay layers that are found at some portions of the site.

Sampling was discontinued after data showed that tebuthiuron had leached and was still present in ground water at concentrations of up to 23 parts per billion (ppb), when restricting soil layers did not impede downward flow of ground water. PRZM modeling of the study site predicted that tebuthiuron would quickly leach to the water table through sandy soils with little organic matter. However, the simulations were unsuccessful at anticipating that some tebuthiuron would also still be present in the unsaturated zone four years after the final application.

DowElanco suggests that the highest ground-water detections were anomalous. Dow attributes these detections from well MW107-D to a shallower depth to water and a higher topography than at the other wells, a longer ground-water flow path to the well through a treated area, and differences in the amount of tree cover upgradient of the wells. Although these factors may help explain the differences in detections in part, the characteristics of the vadose zone and aquifer found at the location of well MW107-D are similar to those found at other locations sampled at this site, and are not uncharacteristic of other sites where tebuthiuron may be applied.

Soil sampling at and near the study site showed convincingly that tebuthiuron can persist at relatively high concentrations in soil and soil water if restrictive layers block leaching to the ground water.

8. RECOMMENDATIONS:

1) Tebuthiuron has been shown in this and previous reports to leach to ground water. The following advisory should be added to tebuthiuron product labels:

4

"This chemical is known to leach through soil into ground water under certain conditions as a result of registered (rangeland and non-crop) uses. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground-water contamination."

2) **Tebuthiuron should be classified as a Restricted Use compound for ground-water concerns.** The Restricted Use rule requires that a chemical trigger certain persistence and mobility parameters; it must also exhibit a number of detections in ground water. Tebuthiuron is rarely chosen as an analyte in monitoring studies and for this reason, limited monitoring data are available for the compound. However, if more ground-water studies were designed to analyze for tebuthiuron, the compound would undoubtedly meet the triggers for Restricted Use (see attached table).

3) Additional restrictions on the use of tebuthiuron should be seriously considered for vulnerable use areas, given its persistence in the environment. The registrant should initiate discussion with EFED/EFGWB to identify such portions of the tebuthiuron use area.

9. BACKGROUND:

Tebuthiuron is an herbicide used for total vegetation woody plant control in noncrop areas, including brush and weed control in rangeland areas, and clearance for rights-of-way. Tebuthiuron moves into the soil root zone where it is absorbed by the roots of woody plants. For susceptible woody plants, tebuthiuron inhibits photosynthesis, resulting in death normally in one to three years after application. After application for selective woody plant control, reapplication may not be necessary for periods of up to 20 years.

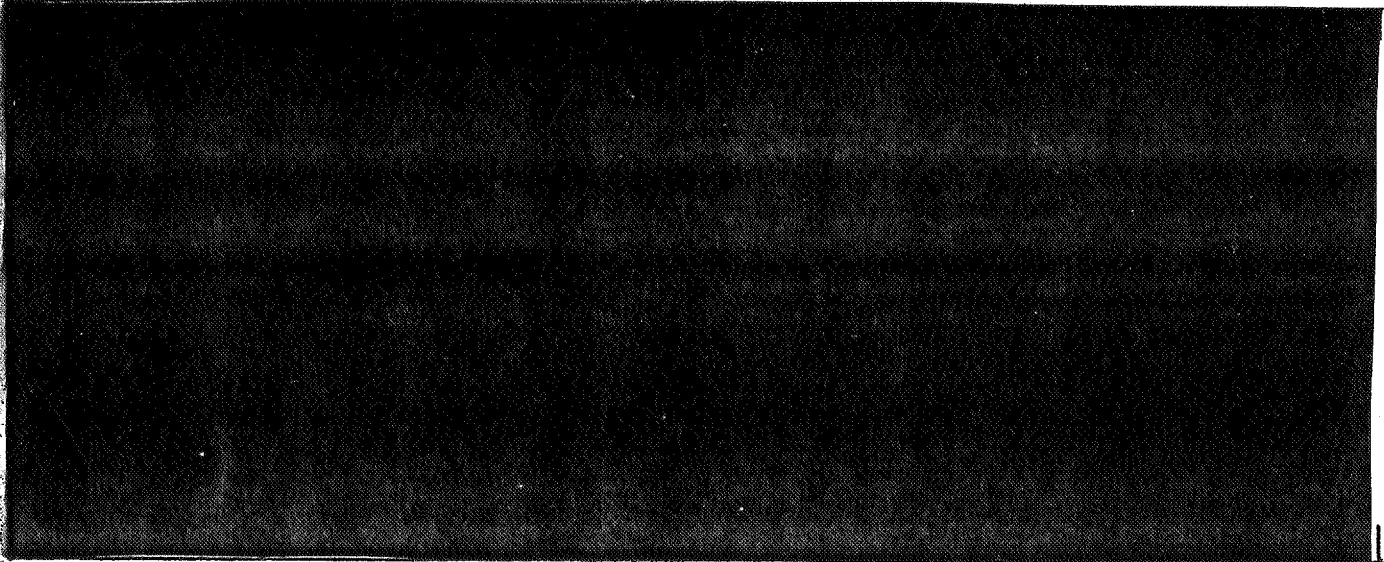
Environmental Fate:

The herbicide tebuthiuron is resistant to hydrolysis, photolysis, and anaerobic soil metabolism. Aerobic metabolism studies for a sandy loam soil indicated a half-life of 35.4 months. Field dissipation half-lives are quite long, ranging from 387 to 783 days. The compound is very mobile in loam, loamy and sandy soils and less mobile in silty loam soils. Soil partition coefficient (K_{ads}) values range from 0.11 to 1.82 mL/g. Furthermore, the major metabolite of tebuthiuron, labeled compound 104, has similar mobility to tebuthiuron. A summary of the environmental fate characteristics from EFGWB's One-Liner Database is provided with this review.

The mobility of tebuthiuron through the soil column predicted by

laboratory studies has been borne out by detections in the field. The EFED/EFGWB Pesticides in Ground Water Database reports tebuthiuron detections in ground water from one well in California (20.7 to 22.1 ppb), and 2 wells in Texas (trace to 380 ppb). In addition, data from this well-designed and conducted study indicate detections in ground water of up to 23 ppb in southeast Texas.

Tebuthiuron has been found through laboratory studies to pose greater problems with phytotoxicity than with animal exposure. DowElanco studies performed before 1982 found that mammals, birds and fish transform and excrete tebuthiuron, rather than accumulate it in body tissues. This is reflected in the Lifetime Health Advisory Level (HAL) of 500 ppb that has been established for tebuthiuron.



Site Characterization:

Site geology consists of eolian sands overlying fluvial deposits. Soil analytical data show that the soils have low clay (4 to 8%) and organic matter (0.1 to 0.7%) content. Particle size distributions of the soil material in the vadose zone were not determined, but drilling logs indicated the textures are primarily very fine sands to sandy clay loams. The drilling logs also indicated that restricting layers, such as caliche and thin clay layers, are present at some locations.

Aquifer hydraulic conductivities were determined through slug tests and/or pumping tests in the sampled monitoring wells in order to estimate the ground-water flow velocity at the site. The range of hydraulic conductivities determined from the wells was 0.3 to 13.9 ft/day, with a geometric mean of 3.1 ft/day. The well with the highest hydraulic conductivity measured was well MW107D.

Deliberative process information not included.

The hydraulic conductivities were used to estimate the average ground-water flow velocities using Darcy's Law and an estimate of the porosity. These velocities were used to determine the travel times along several horizontal flow paths. Estimates of travel times for ground water to travel 130 feet, the longest distance between a well with tebuthiuron detections and an application band, ranged from 7.6 to 20.9 years. Using the velocities calculated at the specific wells, ground water would require 1.4 and 4.1 years to travel the distance from an application band (15 and 70 feet) to wells MW-107D and MW104, respectively.

Soil samples were collected and analyzed during site characterization and once during the field study to evaluate the extent of leaching of tebuthiuron through the soil column above the water table. Site characterization samples taken in June 1989 resulted in only 3 detections out of 57 samples, with a maximum concentration of 13 ppb. Samples were subsequently taken in November 1989 to determine whether the small detection rate was due to residue decay, uptake by tree roots, or leaching to the water table. The November samples showed that significant residues remained in the soil column 3 years after application (up to 150 ppb), possibly perched above restricting layers or roots. That contention was strengthened by a 79 ppb detection in a sample taken a mile from the study site, but within a more clayey zone of the same treated area, in October 1990. These detections suggested that tebuthiuron residues not restricted by clay layers leached to the water table.

10. DISCUSSION:

The current study was conducted at the Kenedy Ranch, near the town of Sarita in southern Texas. Tebuthiuron was applied in 140-foot wide strips (a 70' swath with two swaths per strip) to a portion of approximately 720 acres, on March 24, 1986. Application rates were 1.5 to 1.75 lb-a.i./acre through stands of live oak, 2 lb-a.i./acre in fenceline application areas, and up to 3.75 lb-a.i./acre where these applications overlapped. Although this overlap application was at a higher rate than intended, it was still below the maximum labeled application rate for rangeland of 4 lb-a.i./acre, and the pastureland maximum label rate of 6 lb-a.i./acre. The intended rate was within the labeled range of 0.75 to 4.0 lb-a.i./acre.

Soil Sampling Results:

Soil samples were collected only once during this retrospective field study, in May, 1990. During the 1986 application of tebuthiuron, the 20% a.i. clay pellets were applied aerially in 70-foot wide swaths through the target trees, and also along fencelines. Control samples (Area A-1) were taken upgradient of the application area, "1X" samples (Areas A-2, A-3) were taken

within the swaths presumably treated at the intended application rate, (live oak or fenceline applications) and "2X" samples (Areas A-4, A-5) were taken from areas where live oak applications overlapped with fenceline applications. Fifteen cores were taken from each area, which were composited in groups of 5 into 3 samples per area. A site map showing the locations of these sampling areas is attached. Samples were taken in 1-foot increments to the top of the water table, which was encountered at the following approximate depths:

A-2:	11 ft
A-3:	14 ft
A-4:	8 ft
A-5:	8 ft.

The sample results for Area A-1 were not presented other than to state that no tebuthiuron was detected.

DowElanco contends that the soil analyses show a difference in leaching potential for soil that received "1X" applications of tebuthiuron, and for that which received "2X" overlap applications. This seems reasonable in light of the fact that only one soil sample taken from site A-2 and A-3 ("1X" application) had any detection of tebuthiuron, while sampling areas A-4 and A-5 ("2X" application overlap areas) had detections of up to 19 ppb starting at 3 feet. None of the background samples had detections at all. Dow notes the relative absence of trees in A-4 and A-5, whereas the "canopy of dead trees" might suggest that tebuthiuron was taken up by the trees in A-2 and A-3.

Ground-Water Sampling Results:

Tebuthiuron was detected in 6 of the 7 monitoring wells sampled, 4 of which had concentrations of tebuthiuron at or above the 3 ppb level of quantitation (LOQ). The wells with the highest concentrations of tebuthiuron, MW107-S and MW107-D (max. 8 ppb and 23 ppb respectively) were installed 15 feet downgradient of a fenceline application area. Wells MW104 and MW108, located 70 and 100 feet downgradient of overlap application area A-4, had maximum detections of 3 and 6 ppb, respectively.

The report suggests some explanations for why well MW107-D has higher concentrations of tebuthiuron than the other wells in the study. For instance, Dow claims that the unsaturated layer in the vicinity of MW107-D is relatively thin. The site map and ground-water elevation maps indicate the difference is on the order of several feet. Regardless of this, and other explanations presented by DowElanco, any differences in the area surrounding MW107-D from the other wells merely reflects natural variabilities that would be expected at any site where tebuthiuron might be used. The detections in this well are valid,

and should not be considered "anomalous".

PRZM Modeling Results:

The Pesticide Root Zone Model (PRZM) was used to determine if model predictions would confirm observations of leaching at four field sites. The transport of tebuthiuron through the soil column was simulated for the five-year period following the final application in 1986. Results of the 1990 simulation of total soil concentrations of tebuthiuron were compared with the results of the May, 1990 soil sampling event, the only soil sampling event of the study.

Available site characterization data were incorporated into the PRZM input files to specifically simulate the Kenedy Ranch site. For those input parameters not measured in the field, estimated values were chosen based on field observations and PRZM manual guidelines. Each input value is described and explained in the report. The meteorological data for the study period was obtained from Sarita National Weather Service weather station, the station nearest to the Kenedy Ranch.

The Dow PRZM simulation predicted that tebuthiuron would leach "very quickly through the Kenedy Ranch soils." They attributed this to the low organic matter content ($<0.5\%$) and field capacities (approx. 1.3 to $1.7 \text{ cm}^3/\text{cm}^3$) of the Kenedy Ranch soils. Dow claims that the low organic matter content would reduce the adsorption of tebuthiuron to the soil, and the low field capacity would result in the quick "flushing" of dissolved tebuthiuron through the soil column after precipitation events.

Tebuthiuron residues did not leach through the soil column as quickly as predicted by the PRZM simulations. Tebuthiuron was still detected in soil at Sites A-3, A-4 and A-5 in May 1990, two years later than the point at which the model predicted a total removal of tebuthiuron from the soil column through leaching and degradation. Tebuthiuron was detected in the 13-14 foot depth (the soil sample directly above the water table) at a concentration of 16 ppb at site A-3, and from a depth of 3 feet to the water table at sites A-4 and A-5 at concentrations of up to 19 ppb.

The wells nearest these sampling areas indicated that although some tebuthiuron persisted in the soil column, residues had leached through to the water table as well. The monitoring wells with the highest detections of tebuthiuron, wells MW107-S and MW107-S, were down gradient of area A-5, which had the highest soil residues of tebuthiuron. The other monitoring wells with detections at or above the LOQ, MW-108 and MW-104, were located downgradient of soil sampling area A-4.

11. REFERENCES

USEPA, 1993. Environmental Fate and Ground Water Branch,
"Memorandum: EEB Science Chapter for Tebuthiuron Reregistration
Eligibility Document." 23 pp.

USEPA, 1993. Environmental Fate and Ground Water Branch,
"Memorandum: Tebuthiuron RED Candidate." 9 pp.

USEPA, 1992. Environmental Fate and Ground Water Branch,
Pesticides in Ground Water Database Summary- Tebuthiuron.

USEPA, 1989. Environmental Fate and Ground Water Branch,
Pesticide Environmental Fate One Line Summary- Tebuthiuron.

**Physical and Chemical Characteristics of TEBUTHIURON
Relative to EPA Restricted Use Criteria (Option 2)**

		CHARACTERISTIC	RESTRICTED USE CRITERIA	REPORTED VALUE
PERSISTENCE	1	Field dissipation half-life	> 3 weeks, or	15 - 45 months (S) ¹
	2	Lab-derived aerobic soil metabolism half-life	> 3 weeks, or	35.4 months (V) ¹
	3	Hydrolysis half-life	< 10% in 30 days, or	> 64 days (V) ¹
	4	Photolysis half-life	< 10% in 30 days, and	Water: Stable (V) Soil: 39.7 days, sandy loam (V)
MOBILITY	5	Soil adsorption: K _d	≤ 5 ml/g, or	0.11 ml/g (sand)(V) ¹ 0.62 ml/g (sand loam)(V) ¹ 0.82 ml/g (loam)(V) ¹ 1.82 ml/g (clay loam)(V) ¹
	6	Soil adsorption: K _{oc}	≤ 500 ml/g, or	4 ml/g (S) ¹
	7	Depth of leaching in field dissipation study	75 cm, and	61 - 183 cm (S) ¹
DETECTIONS	8	Number of wells and states with detections	25 wells in 4 or more states, or	8 wells in 4 states*
	9	Number of counties with detections > 10% of MCL/HA	3 counties at > 50 ppb	1 county above 50 ppb*

Shaded area indicates that parameter exceeds trigger.

Option 2 requires [(1 or 2 or 3 or 4) and (5 or 6 or 7)] and (8 or 9)

*monitoring for tebuthiuron has only been conducted in 5 states

Tebuthiuron

Page _____ is not included in this copy.

Pages 12 through 14 are not included.

The material not included contains the following type of information:

- ____ Identity of product inert ingredients.
- ____ Identity of product impurities.
- ____ Description of the product manufacturing process.
- ____ Description of quality control procedures.
- ____ Identity of the source of product ingredients.
- ____ Sales or other commercial/financial information.
- ____ A draft product label.
- ____ The product confidential statement of formula.
- ____ Information about a pending registration action.
- ☒ FIFRA registration data.
- ____ The document is a duplicate of page(s) _____.
- ____ The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
TEBUTHIURON

Last Update on March 26, 1993

[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

LOGOUT	Reviewer: KJC	Section Head: JB	Date: 3/26/93
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Common Name: TEBUTHIURON

Smiles Code: s(c(n1)C(C)(C)C)c(n1)N(C(=O)NC)C

PC Code # : 105501

CAS #: 34014-18-1

Caswell #:

Chem. Name : N-[5-(1,1-DIMETHYLETHYL)-1,3,4-THIADIAZOL-2-YL]-
N',N'-DIMETHYLUREA

Action Type: Herbicide

Trade Names: SPIKE; GRASLAN

(Formul'tn): WP 80%, 40% PELLET; DRY FLOWABLE 20% PELLET, 6% GRANULE

Physical State:

Use : FOR TOTAL VEGETATION WOODY PLANT CONTROL IN NONCROPLAND
Patterns : AREAS AND FOR SPOT TREATMENT IN PASTURES.
(% Usage) :
:

Empirical Form: $C_9H_{16}N_4OS$

Molecular Wgt.: 228.31

Vapor Pressure: $2.00E-6$ Torr

Melting Point : °C

Boiling Point: °C

Log Kow : 1.79

pKa: °C

Henry's : E Atm. M3/Mol (Measured) $2.40E-10$ (calc'd)

Solubility in ...

Comments

Water	2.50E	3	ppm	@20.0	°C
Acetone	E		ppm	@	°C
Acetonitrile	E		ppm	@	°C
Benzene	E		ppm	@	°C
Chloroform	E		ppm	@	°C
Ethanol	E		ppm	@	°C
Methanol	E		ppm	@	°C
Toluene	E		ppm	@	°C
Xylene	E		ppm	@	°C
	E		ppm	@	°C
	E		ppm	@	°C

Hydrolysis (161-1)

[] pH 5.0:
[] pH 7.0:
[V] pH 9.0:>64 DA
[V] pH 3.0:>64 DA
[V] pH 6.0:>64 DA
[] pH :

15

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY

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Photolysis (161-2, -3, -4)

[V] Water: STABLE

[] :
[] :
[] :

[V] Soil : T 1/2 = 39.7 DAYS ON SANDY LOAM

[] Air :

Aerobic Soil Metabolism (162-1)

[S] IN LOAM SOIL AFTER 273 DAYS,

[] CONC. DECREASED FROM INITIAL

[] 8 PPM TO 5.7 PPM

[V] t_{1/2} = 35.4 months

[]
[]
[]

Anaerobic Soil Metabolism (162-2)

[V] >48 WEEKS IN LOAM SOIL, WITH

[] COMP. 104 AS MAJOR DEGRADATE.

[]
[]
[]
[]
[]
[]

Anaerobic Aquatic Metabolism (162-3)

[V] t_{1/2} => 1 yr

[]
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Aerobic Aquatic Metabolism (162-4)

[V] t 1/2 = >> 30 days

[]
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[]

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
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Soil Partition Coefficient (Kd) (163-1)

[]	SOIL	%OM	Ka
[V]	SAND	0.5	0.11
[V]	SdLm	1.4	0.62
[V]	LOAM	1.8	0.82
[V]	ClLm	2.0	1.82
[]	(Ka INCREASES WITH %OM)		

Soil Rf Factors (163-1)

[S] IN A 12" COLUMN OF FINE SAND
[] SOIL LEACHED WITH 20", THE
[] LEACHATE CONTAINED >94% OF
[] THE APPLIED.
[]
[]

Laboratory Volatility (163-2)

[]
[]

Field Volatility (163-3)

[]
[]

Terrestrial Field Dissipation (164-1)

[S] T1/2= 15 MONTHS IN AREAS OF MODERATE TO HEAVY RAINFALL,
[] AND UP TO 45 MONTHS IN LOW RAINFALL.
[S] >33 MONTHS IN LOAM (FRESNO, CA); 12-15 MONTHS IN CLAY SOIL
[] (LOUISIANA); 12-15 MONTHS IN LOAM (GREENFIELD, IN). MAJOR
[] DEGRADATE, COMPD 104, OCCURRED AT 3.9 TO 11.5% OF APPLIED
[] IN THE TIME PERIODS SHOWN.
[]
[] INTERIM REPORT OF TERR FLD DISSIP STUDY ESTIMATED T 1/2 OF 1-2 YR
[] IN CA, FL, NE. LEACHING >72" IN FL; SMALL AMTS LEACHED TO 24"
[] IN CA AND NE.

Aquatic Dissipation (164-2)

[] REQUIRED BUT NOT SUBMITTED. SEE RED MEMO OF 03/04/93.
[]
[]
[]
[]
[]

Forestry Dissipation (164-3)

[]
[]

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
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Long-Term Soil Dissipation (164-5)

[]
[]

Accumulation in Rotational Crops, Confined (165-1)

[]
[]

Accumulation in Rotational Crops, Field (165-2)

[]
[]

Accumulation in Irrigated Crops (165-3)

[]
[]

Bioaccumulation in Fish (165-4)

[V] BCF = 1.98 for edible; 3.40 for nonedible; and 2.63 for whole
[] fish; rapid depuration.

Bioaccumulation in Non-Target Organisms (165-5)

[]
[]

Ground Water Monitoring, Prospective (166-1)

[]
[]
[]
[]

Ground Water Monitoring, Small Scale Retrospective (166-2)

[] Study completed in TEXAS, partial results have been reviewed
[] final report anticipated March 1992. RESIDUES IN SOIL with 2x
[] application, depths 3-8 ft; 0.001 - 0.019 ppm 4 years after appli-
[] cation. IN GROUND WATER 0.002 to 0.023 ppm 4 years after appl.

Ground Water Monitoring, Large Scale Retrospective (166-3)

[] ***CONTINUED (166-2) **Depth to ground water 5 to 30 feet be
[] ground surface. Sandy soils (4% clay, 90% sand); Geology
[] eolian sands & fluvial deposits (mostly coarse texture - sands,
[] loamy sands)

Ground Water Monitoring, Miscellaneous Data (158.75)

[] HAS BEEN FOUND IN SHALLOW GROUND WATERS IN TEXAS. PESTICIDES IN
[] GROUND WATER DATABASE (1992) INDICATES IT HAS BEEN FOUND IN GW IN
[] TX AND CALIF.

Environmental Fate & Effects Division
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Field Runoff (167-1)

[]
[]
[]
[]

Surface Water Monitoring (167-2)

[]
[]
[]
[]

Spray Drift, Droplet Spectrum (201-1)

[] REQUIRED
[]
[]
[]

Spray Drift, Field Evaluation (202-1)

[] REQUIRED
[]
[]
[]

Degradation Products

N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N-methylurea
N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N'-methylurea
5-(1,1-dimethylethyl)-2-methylamino-1,3,4-thiadiazol
N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N-methyl-N'-hydr-
oxymethyl-urea

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Comments

Even with a heavy rain and runoff event, only 10 ppb maximum was found in a pond a short distance from the watershed.
After 30 days aging in SdLm, 97% of radio. was present as parent.

Soil Koc = 4

Based on study in Texas, tebuthiuron is mobile in the sandy soils and persistent in both the vadose zone and ground water.

References: EPA REVIEWS
Writer : PJH, JKW, GML, AWJ